

Transnational Access Report

1. General Information

Project Acronym (ID):	PINs and gravitropism 1
Project Title	A root gravitropic response requireskinase-mediated activation and/or retargeting of PIN auxin efflux carriers in gravity sensing columella cells
Installation used	RootTrace
Name of Group Leader	Benjamin Weller
Name of organization	Technische Universität München

2. Duration of access

Begin of the project	End of the project
22.04.2014	02.05.2014

3. Project summary (max. 250 words)

The auxin efflux carriers PIN3 (and PIN7) have been shown to be required for the initial differential auxin gradient. However, the mechanism for this rapid redistribution of auxin is still poorly understood. Recently, several classes of kinases have been shown to be involved in polar targeting and activation of plasma membrane (PM) associated PIN proteins. The PINOID kinases phosphorylate PM associated PINs at specific serines in the large hydrophilic loop to direct their apicalization in the cell, while the D6PK class of kinases are involved in auxin transport activation. In order to investigate the link between PIN3 polarization/activation and AGCVIII kinases, we first sought to analyze the root gravitropism phenotypes of various AGCVIII kinase mutants. A combination of expression data analysis of the various kinases, in order to ensure that these proteins are expressed in the relevant tissues, and phenotyping for the gravitropism response was used to narrow down the list of potential kinases that might play a role in this physiological response.

4. Description of work(max. 250 words)

RootTrace was used in order to phenotype for the negative gravitropic response in various AGCVIII kinases. Seeds were plated on half-strength MS medium and grown vertically for 5 days under continuous light. Seedlings were subsequently subjected to a 90 degree turn in the dark, in order to exclude possible effects of root negative phototropism. RootTrace was then used to monitor the bending response of the root with high temporal resolution using an infra-red camera.

5. Main achievements (max. 250 words)

The phenotyping using RootTrace has helped us identify potential candidate AGCVIII kinases that might play a role in the gravity response of roots. However, the phenotypes found were not as strong as originally anticipated. This could be due in large part to genetic redundancy of sub-families of AGCVIII kinases. Some higher-order mutants were available for analysis, however, complex mutants of closely related kinases are currently being generated and will be analyzed in the same way in the future, once they are available.